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(54) Title: ARTICLES COMPRISING HIGH-ELECTRICAL-CONDUCTIVITY NANOCOMPOSITE MATERIAL AND METHOD FOR FABRICATING SAME

(57) **Abstract:** This invention discloses novel nanocomposite material structures which are strong, highly conductive, and fatigue-resistant. It also discloses novel fabrication techniques to obtain such structures. The new nanocomposite materials comprise a high-conductivity base metal, such as copper, incorporating high-conductivity dispersoid particles that simultaneously minimize field enhancements, maintain good thermal conductivity, and enhance mechanical strength. The use of metal nanoparticles with electrical conductivity comparable to that of the base automatically removes the regions of higher RF field and enhanced current density. Additionally, conductive nanoparticles will reduce the surface's sensitivity to arc or sputtering damage. If the surface is sputtered away to uncover the nanoparticles, their properties will not be dramatically different from the base surface. Most importantly, the secondary electron emission coefficients of all materials in the nanocomposite are small and close to unity, whereas the previously used insulating particles can produce significant and undesirable electron multiplication.